

PATENT ABSTRACTS OF JAPAN

(11)Publication number : 07-070545

(43)Date of publication of application : 14.03.1995

(51)Int.Cl.

C09J201/00
C09J109/00
C09J123/14
C09J163/02

(21)Application number : 05-239246

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(22)Date of filing : 01.09.1993

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(54) PRESSURE-SENSITIVE ADHESIVE COMPOSITION

(57)Abstract:

PURPOSE: To obtain a composition having adjustable pressure-sensitive adhesiveness by mixing a pressure-sensitive adhesive having a hydrophobic polymer as the base polymer with a hydrophilic polymer so as to form a specified structure.

CONSTITUTION: The composition is prepared by mixing a pressure-sensitive adhesive containing a hydrophobic polymer, as the base polymer, which is desirably at least one member selected from among a propylene/hexene copolymer, isoprene rubber, and a styrene/isoprene block copolymer with a hydrophilic polymer, desirably a copolymer having a hydrophobic part and a hydrophilic part in the polymer molecule, more desirably at least one polymer selected from among polyvinylpyrrolidone, polyvinyl butyral, polyethylene glycol, polypropylene glycol, and polyoxyethylene nonylphenyl ether so as to form a composition having a sea-island structure in which the hydrophobic polymer and the hydrophilic polymer do not dissolved in each other.

LEGAL STATUS

[Date of request for examination]

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

[Patent number]

[Date of registration]

[Number of appeal against examiner's
decision of rejection]

[Date of requesting appeal against examiner's
decision of rejection]

[Date of extinction of right]

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CLAIMS

[Claim(s)]

[Claim 1]A pressure sensitive adhesive composition a hydrophobic polymer and hydrophilic polymer which make it come to contain hydrophilic polymer are not mutually compatible in a binder which makes a hydrophobic polymer base polymer, and taking sea island structure.

[Claim 2]The pressure sensitive adhesive composition according to claim 1, wherein a hydrophobic polymer is a kind selected from a propylene-hexene copolymer, polyisoprene rubber, or a styrene isoprene block copolymer.

[Claim 3]The pressure sensitive adhesive composition according to claim 1 being a copolymer characterized by comprising the following.

Hydrophilic polymer is a hydrophobic part to polymer intramolecular.

A hydrophilic portion.

[Claim 4]The pressure sensitive adhesive composition according to claim 1, wherein hydrophilic polymer is a kind selected from a polyvinyl pyrrolidone, a polyvinyl butyral, a polyethylene glycol, a polypropylene glycol, and polyoxyethylene nonylphenyl ether.

[Claim 5]A pressure sensitive adhesive composition given in four from Claim 1, wherein hydrophilic polymer comes to distribute a third component of hydrophilic nature.

[Claim 6]The pressure sensitive adhesive composition according to claim 5, wherein third components of hydrophilic nature are medicinal properties.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application]This invention relates to a pressure sensitive adhesive composition. More particularly, this invention relates to the pressure sensitive adhesive composition which the hydrophobic polymer and hydrophilic polymer which make it come to contain hydrophilic polymer are not mutually compatible in the binder which makes a hydrophobic polymer base polymer, and takes sea island structure, in order to control adhesion performances, such as raising or lowering adhesive power. In order to obtain the binder containing third components, such as medicinal properties, it is related with the new pressure sensitive adhesive composition which makes hydrophilic polymer distribute third components, such as medicinal properties, and makes the binder which uses a hydrophobic polymer as a base come to contain this hydrophilic polymer.

[0002]

[Description of the Prior Art]A binder mainly consists of base polymer and a tackifier, and contains further little softeners, a bulking agent, an antioxidant, a plasticizer, a functional agent, etc. depending on a kind. The adhesive power of a binder is decided by combination, such as a kind of base polymer, and a kind of a molecular weight and tackifier, and the using rate of those.

[0003]Conventionally, in manufacture of a binder, the compatibility between ingredients is thought as important at the same time it takes into consideration each molecular weight, such as base polymer and a tackifier, Tg, and various physical properties. Adhesive power changes with the loadings of a tackifier a lot, and, generally shows the maximum 50 to about 60%. It was difficult for adhesive power to decrease rapidly and to control adhesive power with the loadings of a tackifier, before and after showing the maximum. For this reason, in order to obtain a binder with different adhesive power, the combination of other suitable base polymers

and tackifiers needed to be discovered.

[0004]Therefore, it is required for manufacture of the binder by which adhesive power was controlled to arrange the raw material of various sorts, and the combination has also been performed by the time-consuming method of generally depending on a feeling on experience very. For this reason, in the binder maker, the time and the cost burden which the trial and error for building a binder with inventory management, the burden of an inventory space, and predetermined adhesive power take have become very large. For this reason, if mitigation of those burdens is attained, the grant to binder industry is great.

[0005]In the combination of base polymer and a tackifier, "The manifestation of adhesive power is scarce in compatibility being smallness" (31 "adhesion" No. 7 P.313 Mitsuo Toyama) is considered conventionally, moreover -- "-- case it is immiscible -- a tackifier -- adhesiveness -- not contributing (the Polymer Division publication meeting P.25 Written by "adhesion technical" Keiji Fukuzawa) -- it is carried out. Therefore, a trial which designs a binder combining an immiscible ingredient was not made.

[0006]It had become [rather than it was easy] an obstacle to make the conventional binder which makes a hydrophobic polymer base polymer contain the medicinal properties of hydrophilic nature, using a direct binder as medical application.

[0007]

[Problem(s) to be Solved by the Invention]Managed control [adhesive power of this invention is continuous, and] is enabled to the above situations, and let the pressure sensitive adhesive composition which makes it possible further to make a third component, especially medicinal properties contain in a binder ingredient be an offer plug.

[0008]

[Means for Solving the Problem]A pressure sensitive adhesive composition a hydrophobic polymer and hydrophilic polymer which make it come to contain hydrophilic polymer not dissolving this invention in a binder which makes 1. hydrophobic polymer base polymer mutually, but taking sea island structure.

2. Pressure sensitive adhesive composition of one above-mentioned description, wherein hydrophobic polymer is kind selected from propylene-hexene copolymer, polyisoprene rubber, or styrene isoprene block copolymer.

3. Pressure sensitive adhesive composition of one above-mentioned description in which hydrophilic polymer is characterized by being copolymer which has hydrophobic part and hydrophilic portion in polymer intramolecular.

4. Pressure sensitive adhesive composition of one above-mentioned description, wherein hydrophilic polymer is kind selected from polyvinyl pyrrolidone, polyvinyl butyral, polyethylene glycol, polypropylene glycol, and polyoxyethylene nonylphenyl ether.

5. Pressure sensitive adhesive composition given in four from the above 1, wherein hydrophilic

polymer comes to distribute third component of hydrophilic nature.

6. Pressure sensitive adhesive composition of five above-mentioned description, wherein third components of hydrophilic nature are medicinal properties.

The purpose is attained by carrying out.

[0009]In order to obtain easily a binder which controls adhesion performances, such as raising or lowering adhesive power, and contains third components of hydrophilic nature, such as medicinal properties, this invention does not have base polymer and a tackifier, and compatibility, or even if it is, it takes a simple method of mixing a small ingredient of hydrophilic nature.

[0010]In this invention, with base polymer used for a binder. Are elastic performance which gives cohesive force a hydrophobic polymer which it has, and For example, crude rubber (NR), A polyisoprene rubber (IR) styrene-butadiene-rubber (SBR) styrene butadiene block copolymer (SBS), They are a styrene isoprene block copolymer (SIS), a propylene-hexene copolymer, isobutylene isoprene rubber, polyisobutylene, polyvinyl isobutyl ether, chloroprene rubber, nitrile rubber, graft rubber, reclaimed rubber, silicone rubber, polyacrylic ester, etc. Especially in these, olefin system rubbers, such as a propylene-hexene copolymer, a styrene isoprene block copolymer, and polyisoprene rubber, are preferred in respect of handling nature, stability, etc.

[0011]A tackifier is hydrophobic resin which gives adhesiveness and an adhesive property by mixing in base polymer, for example, rosin, rosin ester, the rosin ester H, polyterpene resin, and a C₅ system -- petroleum resin and a C₉ system -- they are petroleum resin, DCPD system petroleum resin, styrene resin, alkylphenol resin, terpene phenol resin, etc.

[0012]As a softener, various plasticizer, polybutene, liquefied tackifier resin, and polyisobutylene low polymer, polyvinyl-isobutyl-ether low polymer, lanolin, depolymerized rubber, process oil, vulcanization oil, etc. can be used.

[0013]In addition, as a bulking agent, a flower of zinc, titanium oxide, silica, aluminium hydroxide, calcium carbonate, barium sulfate, starch, clay, talc, etc. as an antiaging agent, 2,6 di-tertiarybutyl 4-methyl phenol, 2,5 di-tertiarybutyl hydroquinone, mercaptobenzimidazole, 1,1 bis(4 hydroxyphenol)cyclohexane, FENIRU beta naphthylamine, etc. may be used at any time.

[0014]Hydrophilic polymer which can be used in this invention does not have base polymer, a tackifier, etc. and compatibility, or contains all the small hydrophilic polymer. This For example, a polyvinyl pyrrolidone, a polyvinyl butyral, polyvinyl alcohol, Although poly(METO) acrylic acid, polyethyleneimine, a polyethylene glycol, a polypropylene glycol, polyvinyl isobutyl ether, polyoxyethylene nonylphenyl ether, etc. are included, it is not limited to this. In these, hydrophilic polymer with hydroxyl groups, such as a polyvinyl pyrrolidone, a polyvinyl butyral, a polyethylene glycol, a polypropylene glycol, and polyoxyethylene nonylphenyl ether, is

preferred in respect of handling nature, safety, etc. There is no "compatibility mentioned above, or with all the small hydrophilic polymer", a copolymer which contains both a hydrophobic part and a hydrophilic portion in polymer intramolecular can also be included, and a partial hydrolysate of polyvinyl acetate and poly(METO) acrylic ester can be mentioned as these examples.

[0015]With a hydrophilic agent, an antioxidant, light stabilizer, drugs, a physiological active substance, etc. with hydrophilic nature are included. It shall be included by hydrophilic agent, when making it combine with hydrophilic polymer chemically and dealing also in a compound which it does not dissolve in hydrophilic polymer enough, or is not hydrophilic nature enough.

[0016]A pressure sensitive adhesive composition of this invention can be manufactured with a conventional method of binder manufacture which mixes an ingredient needed. However, since it depends for adhesive power of this pressure sensitive adhesive composition on a dispersion state of hydrophilic polymer, setting out of mixing requirements according to combination is strict. An experiment everyday for men of the same trade can determine this easily.

[0017]A pressure sensitive adhesive composition which introduces a hydrophilic agent as well as a method mentioned above can be manufactured. However, in this case, a hydrophilic agent may be beforehand mixed with hydrophilic polymer, may be made to react, and also may be introduced into a constituent independently of hydrophilic polymer.

[0018]

[Function]It is able for the adhesive power of a binder to change to it comparatively linearly, and to rise or drop the adhesive power of a binder to it by the content of hydrophilic polymer, if hydrophilic polymer is contained in the binder which consists of a mixture of base polymer and the tackifier which consist of hydrophobic polymers.

[0019]Although this invention is not restrained by the following theories, hydrophobic base polymer and hydrophilic polymer have taken sea island structure in the mixed state, and are considered that the structure is participating in control of adhesive power.

[0020]The pressure sensitive adhesive composition, its manufacturing method, and directions of this invention are illustrated below.

[0021]

[Comparative example 1] When adhesive power was measured by a 180-degree friction test (JISZ2037) about what carried out stirring mixing of propylene-hexene copolymer 100 weight section and tackifier yeast tuck H100-W25 weight section which are hydrophobic elastic body polymers, exfoliation time was for 25 minutes.

[0022]

[Work example 1]Into the stirring mixture of propylene-hexene copolymer 100 weight section and tackifier yeast tuck H100-W25 weight section which was shown in the comparative

example 1 and which is a hydrophobic elastic body polymer. Adhesive power was measured by the 180-degree friction test same about what carried out stirring mixing of the polyvinyl pyrrolidone which is hydrophilic polymer. When the using rate of a polyvinyl pyrrolidone was made into 2.5vol%, exfoliation time was for 20 minutes. Then, when the using rate was changed one by one, exfoliation time was for 15 minutes in the meantime, when it fell linearly according to the using rate and was made into 5vol%.

[0023]

[Work example 2] Into the stirring mixture of propylene-hexene copolymer 100 weight section and tackifier yeast tuck H100-W25 weight section which was shown in the comparative example 1 and which is a hydrophobic elastic body polymer. Adhesive power was measured by the 180-degree friction test same about what carried out stirring mixing of the polyvinyl butyral which is hydrophilic polymer. When the using rate of a polyvinyl butyral was made into 2.5vol%, exfoliation time was for 29 minutes. Then, when the using rate was changed one by one, exfoliation time was for 33 minutes in the meantime, when it fell linearly according to the using rate and was made into 5vol%.

[0024]

[Comparative example 2] Exfoliation time was 26 hours when adhesive power was measured by a 180-degree friction test (JISZ2037) about what carried out stirring mixing of the amount part of propylene-hexene copolymer 100 and tackifier yeast tuck H100-W100 weight section which are hydrophobic elastic body polymers.

[0025]

[Work example 3] Into the stirring mixture of propylene-hexene copolymer 100 weight section and tackifier yeast tuck H100-W100 weight section which was shown in the comparative example 2 and which is a hydrophobic elastic body polymer. Adhesive power was measured by the 180-degree friction test same about what carried out stirring mixing of the polyvinyl pyrrolidone which is hydrophilic polymer. Exfoliation time was 21 hours when the using rate of a polyvinyl pyrrolidone was made into 1vol%. Then, when the using rate was changed one by one, exfoliation time was 16 hours in the meantime, when it fell linearly according to the using rate and was made into 2vol%.

[0026]

[Work example 4] The same result as the place which used isoprene rubber as a hydrophobic elastic body polymer in working example 1-3 was obtained. That is, that to which adhesive power rose or fell was obtained.

[0027]

[Work example 5] The same result as the place which used the styrene isoprene block copolymer as a hydrophobic elastic body polymer in working example 1-3 was obtained. That is, that to which adhesive power rose or fell was obtained.

[0028]

[Work example 6] Acetylsalicylic acid chloride was made to react to polyvinyl alcohol selectively, and the pressure sensitive adhesive composition was manufactured like working example 1 except making this into hydrophilic polymer. When contacting the field which applied this to a physiological saline via a micropore membrane, acetylsalicylic acid and a small amount of salicylic acid were released gradually into the salt solution.

[0029]

[Effect of the Invention] I hear that the pressure sensitive adhesive composition of this invention can only mix hydrophilic polymer in the conventional binder, and it can use it as the binder by which adhesive power was controlled. This reduces the problem which binder industry holds and is considered to lead to the fall of the cost of a binder. The pressure sensitive adhesive composition of this invention can hold drugs with generally being [much] hydrophilic nature, and since the hydrophilic portion which penetrates sweat is included when this is used as endermic drugs, it also provides the advantage that the problem of exfoliation by perspiration is solved enough. Since spreading of the binder to the whole substrate surface is not conventionally performed in the field of the re-peeling-off tape of weak adhesiveness [pressure sensitive adhesive composition / of this invention], Also for the use which had the problem as a precise masking tape, if adhesive power is weakened by hydrophilic polymer, the remarkable advantage that the use of a binder -- manufacture of the weak adhesion masking tape of a whole surface coating mold is attained -- becomes wide range will also be given.

[Translation done.]